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XI. *A Letter to the Rev. Dr. William Brakenridge, Rector of St. Michael Bassishaw, London, and F. R. S. concerning the Term and Period of Human Life: In which the Inequalities in constructing, and the false Conclusions drawn from Dr. Halley's Breslau Table are fully proved; the supposed extraordinary Healthfulness of that Place is particularly examined, and confuted; and its real State equalled by divers Places in England; the Imperfection of all the Tables formed upon 10000 Lives is shewn; and a Method propoposed to obtain one much better: By T. W. A. M.*

“ It were to be wished, that some inland town could be found in
 “ England, where there was kept an annual register of births
 “ and burials, with the ages of the deceased, and where there
 “ is no confluence of strangers.”

Dr. Brakenridge, in *Phil. Trans.* Vol. XLIX. p. 172.

“ An author should be fond of reading his works to those, who
 “ know how to correct, and esteem them.—He that will not
 “ be corrected, or advised, in his writings, is a-kin to a pe-
 “ dant.” *Monf. De la Bruyere*, transl. by N. Rowe, Esq;

Quid dignum tanto feret hic promissor hiatu? *HOR. de Art. Poet.*

Reverend Sir,

1760.

Read Jan. 29,
 & Feb. 5, 1761.

AS I highly honour your ingenuity,
 and applaud your candid treatment
 of those, who entertain sentiments different from
 your

your own, while they attempt to discover useful truth, I presume to lay before you, a great master of the subject on which I write, some hints relating to what has been published, and hope to give, as has been desired (1), a little further light, by what I have observed from my own parish for 24 years past, having noted the particular ages of 1700 persons buried in that time (2), from the London bills, more especially on the age of 100 years, and upwards, and from the accounts of every other place I could procure. I shall mention at present a few leading points only, and those as briefly as I can, sensible of your ability to trace their consequences, and present them as they occur to mind, on view of your table and discourse in the Philosophical Transactions, Vol. XLIX. p. 167.

Comparing the burials of London and Breslau, you say 8110 die at London, and 202 at Breslau, under 2 years of age. I acknowledge it not only yours, but a current opinion, taken as a first principle, that at Breslau about $\frac{1}{3}$ of those that are born die under that age; and the place has been celebrated for its healthfulness, for the successful care of infants in particular, and for the good constitution and longevity of its inhabitants in general, a place much envied, and much contended for. Now I grant, that the numbers 145 and 57 make 202; and that $1000 - 202 = 798$, which stand in the third

(1) Richards' Annuities on Lives, 1739, pref. iii. Dr. Brakenridge, Phil. Trans. Vol. XLIX. p. 172.

(2) Intending, if I should live, to publish them, with extracts from the registers for 200 years, and the result of the number of inhabitants twice taken from house to house.

year in Dr. Halley's table; but still can by no means admit the inference (and am surprized it should ever be imagined, that of 1000 children born at Breslau, 202 only die under 2 years of age), for very good reasons, to be found in the book of nature, and in Dr. Halley's dissertation too, as I shall make appear by and by.

In the mean time, let me observe how much it were to be wished, that all, who write upon this subject, would begin from the birth, or 0 year, and give a true annual register of the growing, the most confirmed, and the declining, state of life, by some method devised to make it visible at once, as I shall shew hereafter, without leaving the reader to try the numbers singly upon every occasion. For while some account from the quick conceptions (3), as in the London bills; others from the living births, as is your way, and I think the best; others from 6 or 9 months, or a full year after the birth, as Dr. Halley and Mr. Ketsboom have done, (and great is the transition from 0 year, or the birth, to those of 1 year old), there must arise confusion at first setting out, and apparent, if not real contradictions, in comparing one account with another. And it should likewise be well remembered, that if a less number are taken for the deaths in the first stage of life than there ought to be, the more in course are thrown (4) back upon the ensuing decads of years; and thus a whole table may be effected by the first year only

(3) Graunt's Observations on the Bills of Mortality, 5th edit. 1676, p. 22. 84, 85. and from hence abortives and stillborn are included in the burials.

(4) See at the end of this Letter, p. 69. (c), (d), (e), and (f).
unfairly

unfairly represented, as Dr. Halley's certainly is, if he ever meant, as he is generally, but I think not rightly, understood.

I said I could not admit, that of 1000 children born at Breslau 202 only died under 2 years of age; and, having prepared you for it, shall now give you the reason. Dr. Halley states the births (5) certain at 1238, and adds farther, that 348 of them do die in the first year; that but 890 arrive at a full year's age; and that 198 more do die in the 5 years next following. Upon which data, I state those 6 years of the local lives and deaths, and their proportionals for 1000 births, as follows.

Year	begin.	Born.	Die.		Born.	Die.
1	1238	—	348	of 1000	—	281
2	890	—	76		719	— 61
3	814	—	49		658	— 40 +
4	735	—	35	} 198	618	— 28
5	730	—	23		590	— 19 +
6	707	—	15		571	— 12
7	692, as in the table; but				559 only, if begin	
					with 1000 births.	

+ signifies an unit taken in to the integers from a decimal of .5 or more.

And from hence I think it very plain, that out of 1238 births at Breslau, 424 die under 2 years old; and therefore, out of 1000, 342 die under that age: which is somewhat more than I observe in my parish,

(5) Lowthorp's Abridgment, 5th edit. 1749, Vol. III. p. 669.
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though mine exceeds Mr. Kerfeboom's (6) account ; and I am better pleased to find, that what I take for the truth lies between them. And here I shall venture to assure you, upon the whole, that when brought to the due proportionals for 1000 births only, the account of Breslau falls in between (7) those of my parish and of All-Saints in Northampton ; so that in reality, there is nothing either remarkably (8) healthful, or long-lived, in the inhabitants of Breslau, as has been imagined, by mistaking our author's meaning, who perhaps might intend his ages should imply the middle of every year, his title being age current, and from the 1238 threw off 238 only for 6 months, or more, at first setting out, and not the whole 348, as he would have done, if intended for the whole year. However, let his design be what it will, the number 692 (being the remainder of 1238 after 6 years deaths) is placed in his table ; and if we take the 692, and what follows thenceforth, we must not forget with what number the author began, nor confound his with other tables, that really begin with 1000 births, because this has 1000 persons in the first year.

It is with great regret, that I mention any blemishes in this table, so much and deservedly esteemed, which has given the lead to many others of the like

Year.	Lives.	Die.
(6) Mr. Kerfeboom's table begins	1 — 1125 — 50 ;	but
the first year from the birth is suppressed,	and 0 year should be	1400 — 275.
He might have said this plainly, to prevent any stumbling at the threshold.		

(7) See p. 69. (*d*), (*b*), (*k*), and (*l*).

(8) Ward's *Clavis Asuræ*, p. 111. Hodgson, pref. Stonehouse, pref. p. 7.

kind,

kind, but I cannot say it is exact. For by departing from his preliminary (9) discourse in the first 6 years, and varying his table from the stated proportions, at their respective ages therein set forth, it is certain the one does not agree with the other, till the years 57 to 62, and in the single years 72 and 80. And it were much to be wished, that Dr. Newman's papers were made public, to discover the origin and justness of those proportional numbers, how they prove from year to year, and from what leading proportions they were deduced.

However, if the consideration of the first year was the only reason for desiring them, it might be needless, there being another passage in the same dissertation, which further confirms what I assert; where, speaking of these tables of Dr. Newman, about to be ranged in particular form by himself, he makes this observation (10). It appears hereby, that the one half of those that are born, die in 17 years time, 1238 [births] being, in that time, reduced to 616. For we cannot, by any means, apply these words to the number 1000 in his own table, which are not reduced to half, till near the 34th year; an assurance to all, that know any thing of these matters, that 1000 births, and 1000 persons, the one in the beginning of life, the other in the beginning of his table, mean very different things, and that any conclusions, truly drawn from the one, may be very false when transferred to the other.

(9) A general state of these may be seen, p. 69. a yearly one would take up too much room here, though I have it before me.

(10) Lowthorp's Abridgment, Vol. III. p. 677.

If some mistakes, and unfair comparisons, arise from divers tables not beginning all from the same point; if in the London accounts the abortive and stillborn must be thrown out, and also an allowance made for as many as die in the greater part of the first year (while the 1238 Breslau births were reducing to 1000 persons only), before a just comparison can be made with Dr. Halley's table, as it now stands; then the 8110 at London (11) must be reduced, or else the 202, or rather the 342 above-mentioned, be further increased by an allowance for such abortive and stillborn. And when these alterations are made, the accounts of the two places will not appear so amazingly different, in proportion to their respective numbers, upon the whole.

Beside the inconvenience of the various accounts not beginning together, I shall add another objection no less material; that the tables are formed in too small numbers, and, by that means, cut off 20 or 30 years of the term of life, and undervalue it in annuities, as nothing worth. He that begins with 1000 only, either stops short of 90, or runs quite out between the 95th and 100th year, and can go no further; because out of 1000 births, it is not expected, so much as one should arrive at the age of 100 years. But what must become of those many

(11) Adding 2000 to the burials divided by 10, is, in effect, adding 20,000 to the whole. The increased column is 5 short, which would arise from additional parts lost, and make the full sum. The last number in the Breslau column should not be 33, but 27. Dr. Brakenridge.

in the London (12) accounts (for instance, in the 30 years, 1728 to 1757 inclusive) 2979 living at 90, 242 living at 100, 10 living at 110, and one living to 138? Are these to be wholly omitted by those, who pretend to give a true state of human life, the first number near thrice as many as the usual tables begin with? Or, could they be overlooked, if the computation began with 100,000, or a million?

Further, should the value of annuities sink so precipitately, and close so soon, will they be granted to persons aged 95 for nothing, as the table of Mr. de Parcieux has it, in the supplement to Chambers's Dictionary? One would imagine thence, that those aged 100, or more, should have a premium to accept of them. And yet, what would be the consequence, if the state granted an annuity to 100,000 persons, and the survivors of them, to subsist intire to the death of the longest liver, and have it to pay 20 or 30 years beyond the utmost expectation represented in such tables? It may here be observed, in respect to London more particularly, that the induction from this residuary part of life is well supported, since at 90, or later, few think of removing from town. Or, if it be insisted upon, that some do remove after that age, it will be allowed, that the burials of the subsequent years would have been higher, if they had all staid and died there. It may seem quite impertinent to mention this to

(12) Mr. Stonehouse forms his account on 529,623, of which 181 lived to 100 years, and upwards; yet, beginning with 1000, closes his table at 95. It is needless to name many others in a general fault, to which the easy management of small numbers is a temptation.

you, who have assured us, in general terms, that the burials (13) after 50 are less than they ought to be, allowing the accounts sufficiently correct, and the numbers in later life not exaggerated, but rather the contrary.

It will be found then of particular service, that for those of 100 years old, and upwards, we have the age of every single death; and forming a table of them yearly decreasing, and applying Dr. Halley's third rule of halving the tabular lives in any year, to discover the term expected, it will come out, that a life being, like one of the 242 aged 100, has an equal chance to live 2 years 3 quarters, or more (14); and, by his process for finding the value from yearly chances, and at 5 per cent. it amounts to more than two years and a half purchase (15). Now, by your table, a life of 85 has not a better expectation; and following too close upon your heels, Mr. Dodson values an annuity of 1 l. for a life (16) of 88 but at 6 s. and 5 d. ready money. I shall not controvert this point; but desire to know, who will grant such annuities, or greater, for all that could be found of that age, or as many of them as should be selected for nominees: I say nothing of the first number in his table. Doubtless you mean by 1 the first year of new-born children; and yet if he means the same,

(13) Phil. Transf. Vol. XLIX. p. 175.

(14) As all the tables do or would reduce life to 0 before 100, how will they emerge again, to join conformably with these in term expected, or value? Yet these are realities, set in public view.

(15) Process in MS. fol. 4.

(16) Phil. Transf. Vol. XLIX. p. 891.

and values an annuity for a new-born child, whose equal chance of life is not 4 years, at 12.51 years purchase, it appears to me greatly over-rated, and I should suspect some fallacy in the method of computation.

Another thing I shall propose to your consideration, is the forming a continual register, if I may use that term, of the proportions of lives and deaths, by adding after each year, how many would have died out of 1000, or one out of how many, or both of them, in subsequent columns, with the differences, increasing, or decreasing, from year to year. If one only be used, I rather prefer the former, as it strikes the eye, is a more natural representation of increasing mortality, and shews at once, if 1000 were to begin every single year, how many of them would die in that year, in proportion to the lives and deaths of such year in the table. The latter may be more agreeable to others, and is of singular use towards the end of life. I shall give a specimen of both on your table for 3 decads, by which you will better perceive what I mean, and the uses (17) that may be made of them.

(17) Vide p. 61.

Year.

Year	Lives.	Die.	Per mille.	One out of	Lives.	Die.	Per mille.	Diff.	One out of	Diff.	Lives.	Die.	Per mille.	One out of
11	406	— 4	9.85	101.5	21	368	— 4	10.87	— .12	— 1.—	31	325	— 5	15.38
12	402	— 4	9.95	100.5	22	364	— 4	10.99	— .12	— 1.—	32	320	— 5	15.63
13	398	— 4	10.05	99.5	23	360	— 4	11.11	— .12	— 1.—	33	315	— 5	15.87
14	394	— 4	10.15	98.5	24	356	— 4	11.24	— .13	— 1.—	34	310	— 5	16.13
15	390	— 4	10.26	97.5	25	352	— 4	11.36	— .12	— 1.—	35	305	— 6	19.67
16	386	— 3	7.77	128.66	26	348	— 4	11.49	— .13	— 1.—	36	299	— 6	20.07
17	383	— 4	10.44	95.75	27	344	— 4	11.63	— .14	— 1.—	37	293	— 5	17.06
18	379	— 4	10.55	94.75	28	340	— 5	14.71	— 3.08	— 18.—	38	288	— 6	20.83
19	375	— 3	8.00	125.—	29	335	— 5	14.93	— .22	— 1.—	39	282	— 5	17.73
20	372	— 4	10.75	93.—	30	330	— 5	15.15	— .22	— 1.—	40	277	— 6	21.66
	3885	— 38	97.77	1034.66		3501	— 43	123.48				3014	— 54	179.63
									824.—					563.832

It is usual with me, to note the yearly differences of mortality, which I could not do here, on account of the irregularity, but only in decad 21, &c. By the way, I must give a reason why I sum up the column of lives, which I consider as so many annual exposures, and this as the total of the lives, each exposed to the chance of mortality for one year; (i. e.) 406 in the first, 402 in the second, &c. and 3885 in the ten years; and, upon the whole, 38 deaths.

Exp.	Die.	Exp.	Die.
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And thence $3885 : 38 :: 10,000 : 97.812$; which last term is the proper state or degree of mortality for that decad, and 9.78 a mean thereof, at an average.

It is generally acknowledged, that some one between the 10th and 20th is the healthiest year, i. e. the year in which fewest would die out of 1000, and the annual degree (18) of mortality should increase (swifter or slower as it happens) from thence to the end of life. But how is such year to be found among the irregularities of the first of these three decads? Or how shall we look upon 10. 11. 14. 15 as a due progression in the second? And if the numbers 16. 19. 20 do go on increasing in the third, why does the degree of mortality go back to 17, then forward to 20, then back to 17 again, and forward to 21 per mille? in such a manner, that one out of 49.8 should die at the age of 36, and but one out of 58.6 at the age of 37; and again, one out of 48 should die at the age of 38, and but one out of 56.4 at the age of 39? Is not this representing the 37th

(18) A mistaken inference from this, see p. 65. note (30).

year of life as a healthier than the 36th; and the 39th healthier than the 38th year of life?

I am sensible you might say, this is owing to the promiscuous changes of 5 and 6 in the deaths, for which you may have reasons, though I cannot fathom them. With me it is not a matter peculiar to your table, but a certain consequence of beginning with 1000 only: for having no changes, but what amount to an unit more, or an unit less, that is too great a leap at once, in such small numbers; when there might have been, in 500 and 600 deaths, room to express duely the intermediate gradations of increase, or decrease, for every single year.

The last thing I shall mention, is the term or expectation of life, shortning too swiftly, and then recoiling. I shall instance in your table, and Dr. Halley's too (and the same will be found in the rest), and apply to them his rule above-mentioned, and the term, or probable expectation of life, will come out thus, for the ages following.

Year.

Year.	Lives.	Per mille.	Diff.	One out of	Term of life.	Diff.	Year.	Lives.	Per mille.	Diff.	One out of	Term of life.	Diff.
77	43	6 139.5	— 3.26	7.16	4.12	— .25	77	68	10 147.0	— 8.1	6.8	4—	— .17
78	37	6 162.1		6.16	3.87	— .04	78	58	9 155.1	— 8.1	6.44	3.83	— .13
79	31	5 161.2		6.2	3.83		79	49	8 163.2	— 7.5	6.12	3.70	
80	26	4 153.8		6.5	4—		80	41	7 170.7	— 5.7	5.85	3.83	
81	22	4 181.8	— 1.97	5.5	4—		81	34	6 176.4	— 2.1	5.66	4.50	
82	18	3 166.6		6—	4—	— .08	82	28	5 178.5		5.6	5—	
83	15	2 133.3		7.5	3.75	— .50	83	23	3 130.4		7.66	5.25	
84	13	2 153.8		6.5	3.25	— .50	84	20	2 100.0		10—	5—	
85	11	2 181.8	— .00	5.5	2.75		85	18	2 111.1		9—	4.50	
According to Dr. Brakenridge's table.													
According to Dr. Halley's table.													

The column per mille, should increase, and that one out of, should decrease, with some sort of regularity: I say no more of these, referring to what I have written above. My design here is to shew, that the term of life (19) decreasing too swiftly, sinks below the truth, and then stands still, or increases, to become agreeable to the rule of nature, found in the course of subsequent years. These irregularities and disproportions might be avoided, by beginning with 43.00 and 68.00; or, it might be as satisfactory to many, to decrease the 4.12 years expected to 2.75, by proper intervals, or differences, greater above than below: an expedient not to be despised, when the capital points, from and to which, are previously settled on good authority. The term found by Dr. Halley's table is still wider from the due course. I am apt to imagine, the consciousness of these difficulties induced you to stop short, and perhaps you will wonder, that any one else would take the pains to surmount them.

But to return. You may possibly think it unreasonable, that any body should insist upon such a variety of scruples, in a case where the best means of information are too lax, and general; yet, I hope, will excuse them, when assured, that my sole reason for insisting upon them, is not a proneness to find faults, but an earnest (you may call it an over-earnest) desire to make what we have better understood, and attain further means of such knowledge, and state

(19) I use this as the shortest form, meaning the equal chance, or probable expectation of life; as many surviving, as dying before such period, among lives of the given age.

them in the least exceptionable manner: for till we get a more authentic account of life, or use what we have, without too much obsequiousness to great names, we shall be as if blind and fettered. During such prejudices and restraint, it is too early to compute values with minute precision, as some do, and wrangle about trifles, while they suffer first principles of greater moment to pass quite unregarded.

Whether my conjecture be right or not, Dr. Halley had reasons why he left off at 84, as you may have for ending at 87; and the term of final direction is settled by another great master (20) at 86. But when many persons outlive such tables, and are most desirous to purchase annuities, upon easy terms, for their lives, and have no rule at all left, it must be very acceptable, by whomsoever faithfully performed, to have a table beginning with the living births, formed upon 100,000 lives at least, and carried on to the extremity, I should almost say the utmost possibility of life, with the swift or slow increase of annual mortality, noted in a subsequent column, and in consequence the term or expectation properly decreasing, from the best life about 5 or 6, till the whole be exhausted: and it would be a satisfaction to me, if, by suggesting any hints, it may put abler hands at work, to bring it at last to such a perfect state, as I conceive, at present, in imagination only.

In prospect of this, give me leave to observe, that the numbers in those columns Per mille and One out

(20) Mr. De Moivre, pref. p. v. (edit. 1725.) tract, p. 10. 47. 76. 79. This strikes off 14 years of Dr. Halley's table. Younger lives can hardly look so far forward, but old persons see them at hand, and the value of all expectations is in proportion to their near approach.

of, may be of use for such a purpose, as directors; and, by inverting the proportionals, be applied to find the deaths of lives given, from year to year (21): for as these may be previously digested, with greater regularity, and the number of deaths found, by multiplying the given lives by the former, or dividing them by the latter, a way is opened for conducting the work in larger numbers, and with great exactness: and I conceive, that ten of the best accounts of different places, each formed by proportion for 10,000 births, and all thrown together in the usual sections, if properly aided in the latter part of life by the London bills, might be sufficient, at least, would be much better than any thing we have; for tables of 1000, 1238, or 1400, are quite distanced here, having no lives at all of 100 years. And yet, who can believe that Dr. Halley's 34,000, if they were so many, much less Mr. Kerseboom's 980,000, had none of 100 years and upwards; when the London bills afford about 8 in a year; and, upon the whole of 750,222 burials in the said 30 years, have 242 of that age? Or, who can give a reason, if they had such, why they constructed their tables on so small a basis, as wholly to exclude them?

It may be said, the 242 persons, dying above 100 years of age, did not arise from 750,222 births in town, but from a great many more brought in from

(21) These might be tried, or regulated, by proportions formed from other accounts, taking the deaths between 10 and 20 (or the most certain period) in each, for the two leading proportionals, and trying above and below for lives and deaths. Lesser accounts of single parishes will not do alone; for as aged lives are rare, one is forgotten before another happens, and in small numbers they are not to be expected.

the country after 20, and probably, upon the whole, from double that number of births. I shall only reply, let the number of births or persons, natives or aliens, be what it will, from which the 242 arise, yet, in some definite number, such and so many instances of longevity are found, of which the present tables take no notice; and though the fact is manifest enough, yet the absurdity, in respect to practice and formation of tables, still continues.

If we look back, we shall find the first sketch, that of Capt. John (22) Graunt (alias Sir William (23) Petty) was formed upon 100 only, and such a table carried the account to the 80th year, or upwards. Next were introduced those of 1000, and extended the computation of life to between 84 and 100; tables formed upon 10,000 would advance to above 105; and upon 100,000, duly proportioned from the materials we have, might continue the account to 115 years, and upwards. If in the first sketch, the supposed term of life was closed too soon, and it was an improvement to carry on an account of the gradual decay beyond the 90th year, why are we to rest here, having additional observations made for more than 60 years, which furnish materials for a further progress? If there is room, and good foundation to advance but 20 years beyond the compass of the present tables, should not this be done? And will it not make a considerable, yet necessary, alteration in all computed values, upon annuities to be granted to persons in the latter part of life?

(22) Graunt's Observations, 5th edit. p. 84.

(23) Phil. Transf. N^o 196.

I have not seen Mr. Smart's tract on the London bills, (when and how was it published?) nor the collections of Mr. Dupre, published by Mr. Buffon, save only through the medium of Mr. Kerseboom's proportions (24), beginning with 1000, not births, but children of 6 months old, or upwards (25); which makes a considerable difference in respect to age given, and yearly deaths, through the whole table; and I almost envy those, who have the desirable use of choice originals. The accounts of Dr. Newman are, I suppose, preserved by your society; and there is a state of the exchequer annuitants (26) often mentioned, but not published, by Mr. Lee. Nevertheless, these last being of divers ages (if the particular age of each person at entry and death be not known, though the gross numbers yearly dying may), as it was too great a presumption to assert, that they began all at the best stage (27) of life, and were so nicely chosen (28), that the duration of 35 years was a thing extraordinary; so it would be a blameable credulity to admit these points for truths, when we continually see how many are resolved to chuse their own lives, or those of their children or favourites, even when they are receded 10 or 20 years from that part of life, which had the largest expectation. Whether it was this matter better con-

(24) Phil. Transf. 1753. p. 239.

(25) This was done, to compare it rightly with Dr. Halley's, which Mr. K. therefore knew was not from 1000 births.

(26) Lee's Essay, 252, 253. "This," he says, "is the best guide of all." Lee's Val. Annuity, p. 47. 51.

(27) Essay 252.

(28) Essay 253.

sidered, or whatever else changed that author's sentiments, yet changed they were; for, in 1737, he accounted a life of 10 years best, and equal to a term of 28 years, and no more; [Lee's Essay, p. 231. 253.] and yet, since, in (his Valuation of Annuities, 2d edit. p. 96.) 1754, he has computed the same kind of life, as equal to a term of 35 years, notwithstanding all the allowances pleaded for in his Essay (29); in full consideration of which, he was afraid of overdoing the matter. And yet, if he would have given us the true result of the London bills, according to his own state, and reckoning with exactness, which he calls to the extremity, a life of 10 years would be found equal to a term of 34.94 years; but one of 4 years old equal to a term of 38.20 years; above 3 years better than his best life.

I should not have mentioned this, but to observe, that it is natural enough, when the expected term of life is taken to the uttermost, to make some allowance. And yet, if allowance is to be made, it should not be by an arbitrary and false representation of life throughout a whole table (30), but left to the discretion of parties concerned, and to be made in proportion to

(29) Page 231.

(30) Mr. Lee rightly concluding, that the degree of mortality ought to increase from the year of greatest expectation to the end of life, erroneously inferred from thence, that the deducend, or part of the term of life wasting in each decad, should be least at first, and greater afterwards; and so apportioned it, as long as he could go on, contrary to all other tables, and even to the course that would arise from his own table of the London bills. Lee's Essay, p. 459. Table II.

the term found by such table; and that, in general, about $\frac{1}{10}$ of the term deducted, in any part of life, would not be unreasonable, when the account is carried on to the full extent of human life, especially if such supposed duration is taken as a rule for price; for reasons well known to you, by comparing the respective (31) value of present and future years at any rate of interest (32), and observing, that a gain of time in the latter, would not be equal in value to the loss of like time in the former.

After many degrading comparisons above-mentioned, to the dishonour of our capital, it may counterbalance them, to hear what this advocate has urged for its healthfulness and longevity, on his own experience. (Lee's Essay, p. 252; 253.) I do not intend to disparage it, by mentioning a place I have known above 40 years, never famed for salubrity, and yet has produced as many (may I say more?) persons of 90, and upwards, than London, as would appear on a fair proportion, formed on the burials of each, by a method too long to be laid before you at present; and I am ready to oppose this, as I did to the former complaints, so to these boastings, being both alike ill-grounded and unreasonable.

As my objections extend to all the accounts I have met with (perhaps I should except Mr. Dupre's, if I could see it intire), you will naturally expect what

(31) This, I find, has been noted by H. B. in observation on Lee's Essay, 1739. p. 18. 21. 33.

(32) This makes hazard of time and hazard of value unequal in course.

I have to offer more perfect in their stead. The ground-work I present would lie in a nutshell (33); the edifice would supply matter for such another letter: and, I think, you will be glad to have a little respite, to consider of this, and judge how far some facts herein set forth ought to be regarded, without which, I presume to affirm, all computations of value will be found inconsistent, and very faulty in some other parts of life.

Upon such an occasion as this, I hope you will excuse the intrusion and tediousness of a new visitor, who aims at further improvements on this subject, both in matter and form. I willingly submit the result of not a little time and pains to your superior judgment, and beg you will either frankly pronounce it time mispent, and labour in vain, or else, by your kind directions, enable me (if the ardor of present inclination should continue) to improve and finish a scheme, perfect enough to bear public view. I can only say, I should endeavour to keep clear of the objections made to other tables, and to support whatever I advance by real facts, or very strong probabilities, and to make the whole consistent and uniform. I do not enter upon any computation of values, nor prefer either of the two methods (34) for finding them; let the facts, upon which they depend, be better ascertained. In order to this, the sole object

(33) See p. 69. letters (g), (b).

(34) One proposed by Dr. Halley, and approved by Mr. De Moivre, the other by Mr. Lee. Richards's Annuities, p. 1. Lee's Valuation, p. 2.

of my present view is, to state, with all exactness, the term and period of human life, being ambitious so to execute this underpart of the work, as may deserve yours, or general approbation.

Having delivered this message, you may form in idea the awkward rusticity of a stranger, introduced the first time to your presence, who hardly knows how, or when it is fit, to make his bow, and withdraw.

I am,

Reverend Sir,

Your great admirer,

and most respectful

humble servant,

T. W.

N. B. In what follows, I am obliged to number 1 year beginning, for the sake of others, which I usually mark 0, and the rest 10, 20, 30, &c.

POST-

P O S T S C R I P T.

Year be- ginning.	Deaths.	Deaths.	Deaths.	Deaths.	Deaths.
I	579½	495	581	469	347
				122 lefs.	
II	46	39	62	50	61
2I	68	58	68	55	69
3I	81	69	86½	70	87
4I	84	72	100	81	101
5I	100½	86	103½	84	103
6I	103	88	100½	81	101
7I	85	73	99	80	97
8I	19	16	30	24	27
9I	4½	4	7½	6	7 (³)
10I	0	0	0	0	0
	1170½ (a)	1000 (b)	1238 (c)	1000 (d)	1000 (e)
				122 more.	
				(f)	
				1700 (g)	1000 (h)
				1453 (i)	1000 (k)
				667	459
				474	
				806	
				93	55 +
				114	67
				138	81
				130 (¹)	77 +
				148	87
				135	79
				81	48 +
				44	26 +
				11	6
				0	0
				1700 (g)	1000 (h)
				1453 (i)	1000 (k)
				667	459
				474	
				806	
				93	55 +
				114	67
				138	81
				130 (¹)	77 +
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				11	6
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				806	
				93	55 +
				114	67

- (a) The result of Dr. Halley's proportionals, (Lowthorp, Vol. III. p. 670.) filled up from year to year, to the 100th year. As these come so near 1174 (stated p. 669. as the annual deaths), it should seem as if the first attempt was made that way, to find how many of such deaths would fall in each decad.
- (b) Exhibits the same for 1000 births.
- (c) By taking in the 238 that were suppressed, stating the first 6 years, according to the preliminary discourse, and continuing the account according to the table; only setting back half a year, or postponing 4 deaths to the 2d decad, [and so half the last year's deaths from every decad to the following] and this gives the 1238 intire.
- (d) Exhibits the last preceding, computed for 1000 births, and as the table ought to be from those data, but yet ill proportioned.
- (e) Shews the decrements, or deaths, according to Dr. Halley's table, beginning with 1000 persons, and exhibiting a supposed body of coexisting people, in all 34,000. The first decad, so much below the truth, from 1000 births only, that it swells the 9 decads following with 122 deaths more than should be, as is represented in (f).
- (g) The deaths of 1700 persons in the parish of Ely Trinity.
- (h) The same proportional for 1000 births.
- (i) and (k) The like for All-Saints in Northampton.
- (l) The halves of the sums of (b) and (k) for 1000 births. For, by comparing (d) and (e), you will see, that the first decad being less than it should be, (i. e.) so much short of 469, throws back 122 deaths upon the other decads of life. And if this were 469, as it ought, it would fall between (b) and (k), Ely-Trinity and All-Saints in Northampton. As this happens in the first decad, I have joined both accounts, and halved them; and the result of it is stated at (l); which will be found as near (d) as can well be expected, in accounts of different places; and with this I shall conclude this Postscript.